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HAWAII'S BOTTOMFISH FISHERY

The Problem:

- In 2005, National Marine Fishery Service (NMFS) determined that over-fishing of bottomfish is occurring in the Main Hawaiian Islands.
- The federal management measure to end over-fishing is to target a 15% or greater reduction in bottomfish fishing mortality in the Main Hawaiian Islands. (A more recent analysis of the commercial catch data reveals that this percentage could increase to up to 24 percent.)

Hawaiian Bottomfish

- Bottomfish fishing is a deep ocean hook-and-line fishery that targets a range of snappers and groupers that live at depths of between 50 to 200 fathoms (300 to 1,200 feet.)
- Approximately 80% of the bottomfish habitat lies in State waters.
- Bottomfish are slow growing and some take 3-6 years to reach sexual maturity.
- About 84% of the commercial landings of onaga in 2000 were immature (not yet able to spawn.)
- There is no month of the year in which at least one bottomfish species is not spawning.

Traditional Hawaiian Practices:

- In ancient Hawaiian times, deep ocean fishing (the blue sea - ten or more fathoms in depth, **Kaha'ulelio**) was available to everyone, not just the tenants of a particular ahupua'a. **Statute Laws of His Majesty Kamehameha III, Article V, 1846**
- Deep ocean fishing was not part of the ahupua'a fishery. Those who wished to fish in the deep ocean sought out these fishing grounds and kept them secret. **Kamakau**
- Deep sea fisheries were the proprietary knowledge of individual fishermen, not the communal property of the ahupua'a. **Kamakau**
- Nearshore fisheries (from shore to the edge of the reefs and where there happens to be no reefs from the distance of one geographical mile seaward of the beach) were part of the ahupua'a. **Statute Laws of His Majesty Kamehameha III, Article V, 1846**
- Deep ocean fishing was conducted based on annual/seasonal weather conditions, not fishery spawning seasons. **Kaha'ulelio**

Modern Bottomfish Management:

- In 1998, DLNR adopted rules creating 19 statewide Bottomfish Restricted Fishing Areas (BRFA) and is now proposing an amendment that reduces the number of statewide BRFAs from 19 to 12.
- Of the strategies to manage bottomfish, BRFAs are the best alternative, because they provide long-term protection for long-lived, slow maturing, relatively sedentary bottomfish resources.
- Given the long lifespan and length of a "bottomfish generation", a seasonal closure of a few to several months is too short to permit recovery of bottomfish populations.
- DLNR selected proposed BRFAs based on the quality of the habitat, habitat features, depth range, potential to reduce catch, location and ocean current conditions then revised those proposed areas again to minimize social and economical hardships to fishing communities.
- DLNR was careful to leave some good fishing areas open for fishers.
- While closing one large area near O'ahu (i.e. Penguin Bank) would meet the goal of reducing the catch by 15%, it would not meet the biological goal of benefiting bottomfish stocks statewide.
- While proposing closures in response to the mandate to reduce mortality, the focus of the plan is on protecting quality bottomfish habitat to ensure long-term sustainability of bottomfish stocks.

Hawai‘i Bottomfish Fishery Status

The Hawai‘i bottomfish fishery is a hook-and-line fishery that targets a range of snappers and groupers that live at depths of between 50 to 200 fathoms (300 to 1,200 feet). In the Main Hawaiian Islands (MHI) approximately 80% of the bottomfish habitat lies in state waters.

Hawaiian bottomfish have been managed as a single stock fishery, rather than by individual species, because you can’t see what you are fishing for at those depths and because bottomfish die after being brought to the surface, where you can see them.

In May 2005, the National Marine Fisheries Service (NMFS) Pacific Islands Region wrote to the Western Pacific Regional Fishery Management Council (WESPAC) and stated that “over-fishing” of the bottomfish species complex is occurring within the Hawaiian Archipelago (at the current level of fishing mortality, the stock will fall below a sustainable threshold and become over-fished)

Over-fishing is different from “over-fished”, which means stocks are actually depleted. (When a fishery has been declared “overfished,” fisheries managers are obligated to CLOSE the fishery.)

The resulting federal management measures to address the overfishing is to target a 15% or greater reduction in bottomfish fishing mortality in the MHI, which is estimated to be the appropriate level of reduction to end overfishing.

“Seasonal” Versus “Area” Closures

Seasonal closures manage time, while area closures manage space. Seasonal closures are most effective when the closure period is based on some time during the animal’s life cycle when it is particularly vulnerable to capture. Area closures are most effective when the closure is based on some place that is of particular importance to the animal’s life cycle.

A seasonal closure affords protection to a species everywhere it exists, but only for a specified period of time. Seasonal closures manage effort more directly, compared to area closures. If fish aggregate during a specific time to spawn, they become more vulnerable (more fish can be caught in a shorter time). A seasonal closure could be an appropriate tool, therefore, if the spawning aggregations occur in a specific area and at a specific time.

An area closure protects a species constantly at that location. Area closures generally manage habitats by prohibiting fishing. If different species prefer to spawn in specific habitats, but during different times of the year, area closures are a more appropriate tool.

A seasonal closure for bottomfish would only affect fishing time. An area closure would protect habitat and fish throughout the year, while the fish are in that area. A time period of a few to several months (a “season”) is not very long for bottomfish populations, given their long lifespans and the length of a “bottomfish generation” (3-6 years), and the fact that some species take at least 5-years to reach reproductive maturity.

Bottomfish are known to be site affiliated, meaning that they tend to frequent certain areas and are not randomly distributed. While they do move, they prefer certain habitat and spend much of their time there. Therefore, if you are able to restrict access to the areas where they spend most of their time, they will be protected from fishing pressure most of the time.

Bottomfish Spawning Seasons

Consultation of scientific literature indicates that for the Hawaiian mixed species bottom-fishery as a whole, there is no month of the year in which at least one species is not spawning (see chart). It also indicates an urgent need for more research and knowledge of the lifecycles of these species.

Documented spawning seasons for individual species are as follows:

Uku (*Aprion virescens*): May–October (Everson et al., 1989).

Ehu (*Etelis carbunculus*): July–September (Kikkawa, 1984).

Onaga (*Etelis coruscans*): June–November (Everson et al., 1989).

Opakapaka (*Pristipomoides filamentosus*): June–December (Kikkawa, 1984).

Hapu'upu'u (*Epinephalus quernus*): January–June (Everson, 1992).

In addition, spawning seasons are unknown for the following two Hawaiian bottomfish species:

Kalekale (*Pristipomoides sieboldi*)

Gindai (*Pristipomoides zonatus*)

As a result, trying to define a discrete bottomfishing season based on spawning cycles would be problematic at best. No matter what months of the year were chosen for the open season, at least one species would be spawning; the selection of the proper months for closure would be a matter of guesswork. The following graphically depicts the various documented spawning seasons of bottomfish in Hawai'i:

BOTTOMFISH SPAWNING	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Opakapaka Spawning Season						XXX	XXX	XXX	XXX	XXX	XXX	XXX
Onaga Spawning Season						XXX	XXX	XXX	XXX	XXX	XXX	
Uku Spawning Season					XXX	XXX	XXX	XXX	XXX	XXX		
Ehu Spawning Season							XXX	XXX	XXX			
Hapu'upu'u Spawning Season	XXX	XXX	XXX	XXX	XXX	XXX						

Two bottomfish species of concern are the ehu and onaga. These species, at least by one study, have a peak spawning period of September to November. The complex spawning peaks July to September (Haight 1993).

A time management regime would also be problematic in light of the long time to sexual maturity exhibited by bottomfish species. This data is available for only two of the Hawaiian species, as follows:

Uku (*Aprion virescens*): 4–5 years (Everson et al., 1989).

Onaga (*Etelis coruscans*): 5–6 years (Everson et al., 1989).

These results illustrate that such deepwater fishes can take approximately half a decade to reach reproductive maturity, thus short term protection for portions of each year would be of little value in rebuilding depleted stocks.

References:

- Everson, A. R. 1992. Sexual maturity and seasonal spawning of hapu'upu'u, *Epinephalus quernus*, in Hawai'i. SWFSC Admin. Rep. H-92-13: 12.
- Everson, A. R., H. A. Williams and B. M. Ito. 1989. Maturation and reproduction in two Hawaiian eteline snappers, uku, *Aprion virescens*, and onaga, *Etelis coruscans*. Fisheries Bulletin, 87 (4): 877–888.
- Kikkawa, B. M. 1984. Maturation, spawning and fecundity of opakapaka, *Pristipomoides filamentosus*, in the Northwestern Hawaiian Islands. Proc.Res.Inv. NWHI. UNIHI-SEAGRANT-MR-84-01:128–148.

Hawaiian Traditional Perspectives on Deep Ocean Fishing

The following are summaries from various referenced material concerning traditional Hawaiian deep ocean fishing practices. In addition, traditional description of the ahupua'a is included.

Kamakau, Samuel Manaiakalani (translated by Mary Kawena Pukui). 1976. *The Works of the People of Old. Na Hana a ka Po'e Kahiko*. Bishop Museum Press, Honolulu. viii+170 pp (Written in 1869, this account indicates that deep sea fisheries were the proprietary knowledge of individual fishermen, not the communal property of the ahupua'a.) Pp. 75–76

Those who wished to fish in the deep ocean sought out these fishing grounds and kept them secret. Ka po'e kahiko ["the people of old"] regarded their secret fishing grounds as ko'a huna, as "calabashes and meat dishes" (he 'umeke a he ipu kai) and as "grandparents" (kupunakane a he kupanawahine) [sources of provisions], and could be robbed and beaten before they would reveal their locations. They pointed out their secret fishing grounds only to their own children. The locations of most of the deep-sea ko'a have been lost: only a few remain known, as the knowledge of their whereabouts has lessened, and the youth of today have not been taught their locations.

Kaha'ulelio, Daniel (translated by Mary Kawena Pukui) 2006, *Ka 'Ohana Lawai'a – Hawaiian Fishing Traditions*; (Chapter 3, Ka Lawaia Moana-Fishing in the Open Ocean; pp 43, 49-51)

Fishing In The Open Ocean

The definition of this word ocean is the blue sea, the deep sea, ten or more fathoms in depth.

The Best Time Of The Year For This Type of Fishing – The best time of the year for this kind of fishing is from October to March. That is an excellent time for deep-sea fishing during the rainy months, for the sea current is good then, zigzagging, circling and running smoothly. The customary wind, the Kaomiho'olua or the No'eau, blows over the ocean currents, strongly on the North or on the East, and the current keeps in one direction all day and all night. Therefore no deep-sea fishing is done in the summer in our place, and for *aku* fishing the time is from April to August.

Handy, E. S. C., E. G. Handy and M. K. Pukui. 1972. *Native Planters in Old Hawai'i. Their life, lore and environment*. Bernice P. Bishop Museum Bulletin 233. xvii + 676 pp. (Provides an excellent account of Hawaiian land divisions and their oversight.)

The moku-o-loko, or 'okana, were subdivided into ahupua'a, the chief political subdivision, for the purpose of taxation, and each of these sections was subject to a lower chief, who was known as the ali'i ai ahupua'a or "chief who eats the ahupua'a.

The title to an ahupua'a was not hereditary; these subdivisions were allocated and reallocated to loyal supporters by the chief of the moku at the time of his accession. Proprietorship of an ahupua'a gave the right to collect taxes from that area.

The typical ahupua'a ran like a wedge from sea to mountains. As Lyons (1875, p. 111) well puts it, the central idea of land division in the Hawaiian Islands was "radial", running from the seashore up into the mountains, thus including fishing rights, cultivable lands, upland timber and planting zones, and areas of valuable bird-catching privileges in the higher mountains.

Mitchell, Donald D. Kilolani. 1992. *Resource Units in Hawaiian Culture*, Revised Ed. The Kamehameha Schools Press, Honolulu. xiv + 303 pp.
(Comments on the boundaries of an ahupua'a.)

At least since the time of 'Umi the moku have been divided into ahupua'a, the most important of the land divisions in pre-Cook Hawai'i. The ahupua'a on the windward sides of the islands were usually entire valleys with the ridges between them as their boundaries.

Nearly every ahupua'a was a tract of land extending from the summit of the mountain to the sea and on to the outer edge of the reef. If there was no reef the boundary extended into the sea a distance that would be a mile and a half by our present day measurement.

Maly, 1999 – (The following excerpt describes the ahupua'a land division or unit, and provides a purpose and rationale for the use of ahupua'a developed by ancient Hawaiians:)

Ahupua'a - A Sustainable Hawaiian Resources Management Unit

The large districts (moku-o-loko) and sub-regions ('okana and kalana) were further divided into manageable units of land, and were tended to by the maka'ainana (people of the land) (Malo, 1951).

Of all the land divisions, perhaps the most significant management unit was the ahupua'a. Ahupua'a are subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name ahu-pua'a or pig altar).

Ahupua'a may be compared to pie-shaped wedges of land that extended from the ocean fisheries fronting the land unit to the mountains or some other feature of geological significances (e.g., a valley or crater). The boundaries of the ahupua'a were generally defined by the topography and cycles and patterns of natural resources occurring within the lands (Lyons, 1875).

The ahupua'a were also divided into smaller manageable parcels of land (such as the 'ili, ko'ele, mala, and kihapai, etc.) in which cultivated resources could be grown and natural resources harvested. As long as sufficient tribute was offered and kapu (restrictions) were observed, the common people, who lived in a given ahupua'a had access to most of the resources from mountain slopes to the ocean. These access rights were almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility for stewardship of the natural environment, and supplying the needs of ones' ali'i (Malo, 1951; Kamakau, 1961; Boundary Commission testimonies, 1873-1886).

Entire ahupua'a, or portions of the land were generally under the jurisdiction of appointed konohiki or lesser chief-landlords, who answered to an ali'i-'ai-ahupua'a (chief who controlled the ahupua'a resources). The ali'i-'ai-ahupua'a in turn answered to an ali'i 'ai moku (chief who claimed the abundance of the entire district).

Thus, ahupua'a resources supported not only the maka'ainana and 'ohana who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided the fruits and vegetables for the diet, and the ocean provided most of the protein, and in communities with long-term royal residents, divisions of labor came to be strictly adhered to.

VOLUME I: KA HANA LAWAI‘A - A ME NÄ KO‘A O NÄ KAI ‘EWALU - A HISTORY OF FISHING PRACTICES AND MARINE FISHERIES OF THE HAWAIIAN ISLANDS Kumu Pono Associates LLC (Maly & Maly, 2003; KPA Study HiPae74-080103) (pages 246-248)

In 1846, Article V of the “Statute Laws of His Majesty Kamehameha III” was published. The law defined the responsibilities and rights the konohiki and people to the wide range of fishing grounds and resources. The law also addressed the practice of designating kapu or restrictions on the taking of fish, tribute of fish paid to the King, and identified specific types of fisheries from the freshwater and pond fisheries to those on the high seas under the jurisdiction of the Kingdom:

ARTICLE V.—OF THE PUBLIC AND PRIVATE RIGHTS OF PISCARY¹ (1846)

SECTION I. The entire marine space, without and seaward of the reefs, upon the coasts of the several islands, comprising the several fishing grounds commonly known as the Kilohee grounds—the Luhee grounds—the Malolo ground, and the fishery of the ocean, from said reefs to the limit of the marine jurisdiction in the first article of this chapter defined, shall be free to the people of these islands. The people shall not be molested in the enjoyment thereof except as hereinafter provided.

SECTION II. The fishing grounds from the reefs, and where there happen to be no reefs from the distance of one geographical mile seaward to the beach at low water mark, shall in law be considered the private property of the landlords whose lands, by ancient regulation, belong to the same; in the possession of which private fisheries, the said landholders shall not be molested except to the extent of the reservations and prohibitions hereinafter set forth.

SECTION III. The landholders shall be considered in law to hold said private fisheries for the equal use of themselves and the [1846:90] tenants on their respective lands; and the tenants shall be at liberty to use the fisheries of their landlords, subject to the restrictions in this article imposed.

SECTION VII. It shall be competent to the landlords, on consultation with the tenants of their lands, in lieu of setting apart some peculiar fish to their exclusive use, as hereinbefore allowed, to prohibit during certain indicated months of the year, all fishing of every description upon their fisheries; and, during the fishing season to exact of each fisherman among their tenants, one thirds part of all the fish taken upon their private fishing grounds.

¹ *Piscary: "The right of fishing; the right of fishing in waters belonging to another person." (MacKenzie et al., 1991:308)*

1998 Bottomfish Restricted Fishing Areas (BRFAs)

In July 1998, following a federal assessment that stocks of ehu and onaga were approaching a low “Spawning Potential Ratio” (SPR) in the Main Hawaiian Islands (MHI), DLNR implemented Bottomfish Restricted Fishing Areas (BRFAs).

The SPR is a measure of the proportion of spawning size fish in the population. In species such as bottomfish, which grow slowly and reach spawning size late in life, the larger fish are even more important to protect than in fast growing, short-lived fishes. Although these fish have a wide range, they tend to hang around particular kinds of areas for relatively long periods of time, making them even more susceptible to overfishing from these locations.

Bottomfish are known to be site affiliated, meaning that they tend to occur in certain areas and are not randomly distributed. They prefer certain habitat and spend much of their time there. If we are able to restrict access to the areas where they spend most of their time, they will be protected most of the time.

For nearly a decade, the State has addressed bottomfish overfishing in the Main Hawaiian Islands using a habitat-based approach. The seven species of fishes managed by DLNR’s Division of Aquatic Resources under the name “bottomfish” include ehu (‘ula‘ula), onaga (‘ula‘ula koa’e), ‘opakapaka, hapu‘upu‘u, kalekale, gindai (‘ukikiki) and lehi (lehe). These fish are strongly tied to depths between 50-200 fathoms and special types of habitat (ridges, terraces, pinnacles, cliffs, canyons, steep slopes and other features which vary by species).

Bottomfish are slow growing and can take 3-6 years to reach sexual maturity. The age of sexual maturity, which relates to the length of a generation for each species, is a good indicator of the period of time it may take to see significant improvement in bottomfish stocks.

In the late 1990s, federal bottomfish management was based on keeping the SPR above 20%. So DLNR-DAR set up 19 BRFAs in the main Hawaiian Islands with the idea of reserving roughly 20% of potential spawning areas as insurance against SPRs dropping too low. The existing BRFAs were established after a public process that sought to identify and protect spawning areas for ehu and onaga. Fishermen played an important role in determining where the BRFAs would be.

About 84% of the commercial landings of onaga from the main Hawaiian Islands in 2000 were immature, that is, the onaga had not yet spawned. This is a very high percentage of immature fish and a strong indicator that the large mature fish are being depleted from the population around the MHI.

There are many factors that influence bottomfish populations. Some we cannot manage, such as food abundance, currents, water quality, temperature, etc. Fishing activity is one of the few factors affecting bottomfish resources that fishers and resource managers working together can address.

Seasonal closures do not offer the quality of protection that BRFAs can over a long period of time, which is needed to ensure that as many bottomfish as possible can reach sexual maturity and reproduce before they are caught. The focus of the State’s plan is on protecting quality bottomfish habitat and the bottomfish frequenting and spawning in that habitat to ensure long-term sustainability of the stocks.

Adjustment to Existing Bottomfish Restricted Fishing Areas to End “Over-Fishing”

As the agency responsible for managing the State’s bottomfish resources, DLNR believes continuing and improving the quality of the habitat contained within closed areas will provide the best protection for bottomfish resources. Management of the state bottomfish resources involves scientific, social, economic, and enforcement considerations.

The available data show that there has been a decrease in fish catch and effort, which was necessary to reduce fishing mortality at the time the BRFAs were implemented. Our data also indicate, however, that the current BRFAs are not all placed in the best areas to conserve bottomfish resources. This is the reason for the changes being made to the current BRFAs.

As was shown in the earlier section on bottomfish spawning seasons, more research is needed on these deepwater species. What is already known about them, however, requires specific protections, and to assure preservation of the species about which more knowledge is needed, general protections must be taken as a precaution, as was begun in 1998 with the initial BRFAs. What we learned from the 19 closures now allows us to more confidently require 12 closures instead, all of which will in turn be studied and evaluated for possible, future amendments.

The purpose of the proposed BRFAs is to close areas with essential bottomfish depth habitats to protect bottomfish resources from fishing effort. The University of Hawai‘i and DLNR surveys verified the presence of bottomfish resources in certain areas, with indications of the presence of large adults (potential spawners) and juvenile bottomfish.

DLNR contracted research through the University of Hawai‘i to conduct bottom habitat scans and create maps of the areas where bottomfish occur. The data provided the basis for evaluating habitat within the existing BRFAs and identifying new areas that would make better BRFAs. DLNR also conducted interviews with bottomfishers and reviewed commercial landings data to examine how the fishery has performed since BRFAs were established in 1998.

Proposed changes to the existing BRFA system were primarily based on multi-beam data analysis, coupled with fishing surveys. The multi-beam data provided precise measurement of essential fish habitat areas, as well as the amounts of slope and hard substrate. Fishing surveys helped verify potential bottomfish habitat sites. This information helped identify potentially good BRFA sites in the Main Hawaiian Islands.

The final recommendation for the number, area and placement of the proposed BRFAs meets requirements to achieve the mandated 15% reduction in fishing mortality and other considerations, such as areas likely to do the most good with respect to larval export, protecting probable breeding habitat and areas utilized by juveniles. The 15% fishing effort reduction is a federal mandate that results from the Magnuson-Stevens Fishery Conservation and Management Act to end an “overfishing” condition for the bottomfish resources in the Main Hawaiian Islands. The mandate applies to landings for the entire MHI (Ka‘ula, Ni‘ihau, Kaua‘i, etc., to the Island of Hawai‘i).

Establishing many BRFAs throughout the islands should provide greater benefit to the MHI stock as a whole than establishing one or two large areas around Oahu. While one large area near Oahu (probably at Penguin Bank) could meet the goal of reducing the catch, it would not meet the biological goal of benefiting bottomfish stocks statewide.

In response to the observation made statewide that overfishing was more of a problem around Oahu, however, an additional BRFA was added at Penguin Bank and adjustments were made to BRFAs around other islands, putting more of “the fix” where the problem (too much fishing effort) is greatest.

DLNR selected the proposed BRFAs based on habitat features, depth range, potential to reduce catch, location and ocean current conditions, and then further revised the BRFA selection to minimize social and economical hardships to fishing communities.

Habitat was considered to be good if it met the criteria for being preferred by bottomfish. The amount of bottomfish catch tells us how many BRFAs should be established. Some of the best habitat occurs in places with rough oceanographic and weather conditions, but these conditions do not reduce the biological importance of these places. They can still provide benefits to the stocks. The focus of the State’s plan is on protecting quality bottomfish habitat to ensure long-term sustainability of the stocks.

DLNR selected areas based on the quality of the habitat but was careful to leave some good areas open for fishers, so they could continue to catch bottomfish. DLNR made an effort to talk with fishers to be sure we didn’t close off all their fishing grounds. BRFAs were adjusted based on fisher comments.

DLNR now has sufficient information to revise the existing system of BRFAs. This information suggests that many of the BRFAs can be re-opened, while some should remain closed - 13 out of 19 existing BRFAs are scheduled to reopen. Although DLNR has not increased the number of BRFAs, we believe we are protecting better quality areas in the revised BRFAs.

By improving the BRFAs, we increase both the likelihood of their success and the effectiveness of the protection we are trying to provide to bottomfish. DLNR’s Divisions of Aquatic Resource (DAR) and Enforcement (DOCARE) believe that the majority of fishers are compliant because they want to sustain the resources. Because of that, many will abide by the regulations enacted to protect bottomfish resources.

Enforcement presence is also key for fishers who may not comply. An effort is being made to better address enforcement issues by DLNR’s DOCARE. Fisher participation to report violations is vital and increases the likelihood that DLNR’s enforcement presence to improve.

Other provisions of the current BRFA management plan (recreational bag limits, bottomfish vessel registration, etc.) will continue. Although the State has considered other options, during 1998 DLNR committed to a habitat-based management system. This was in part because, at the time, the only successful management scheme that had been tested for bottomfish was an area-based system (for snappers and groupers in Florida). Now, the State’s decision-making is based on its and its fishers’ expertise, experience and analysis.

Thus, the final recommendation for the number, area and placement of BRFAs of the present proposal is based on the State’s efforts to achieve the federally mandated 15% reduction in fishing mortality and other considerations, such as areas likely to do the most good with respect to larval export, protecting probable breeding habitat and areas utilized by juveniles.

Summary of Public Input and Changes in the BRFA Plan, by County

Kauai County:

There are now three, rather than five BRFAs in Kauai County. We removed one north of Ni‘ihau and one north of Kauai. The public felt there were too many BRFAs proposed in Kauai County. For such a small area, we shared their concern, so we made some adjustments, keeping in mind the need to protect fish and habitat, yet making sure there are still accessible fishing areas in each region.

Honolulu/O‘ahu:

The proposed BRFA near Hale‘iwa (new letter “D”) was made smaller than originally proposed to allow safe navigation around Ka‘ena Point and leave a little more open fishing area. We received the comment here and elsewhere that rough current areas (such as Ka‘ena Point) serve as a natural deterrent to overfishing (only the best fishers can work these).

The current BRFA plan tries to incorporate areas where currents may help with the spread of fish eggs and larvae (look for an update on the BRFA plan design). Please note that existing BRFA #4 would reopen to fishing.

Maui County:

The Penguin Bank area (new letter “F”) was moved westward in response to concerns from Moloka‘i and expanded to accomplish the 15% federally required catch reduction.

The recommendation to close areas of Penguin Bank, rather than focus on less heavily fished areas was made strongly at many of the meetings (including on O‘ahu). This was something of surprise, as we had been trying to avoid closures at Penguin Bank. Perhaps the point was best stated by one of the NMFS scientists at the meeting (he was referring to the need for management measures in the MHI), when he said “put the fix where the problem is”.

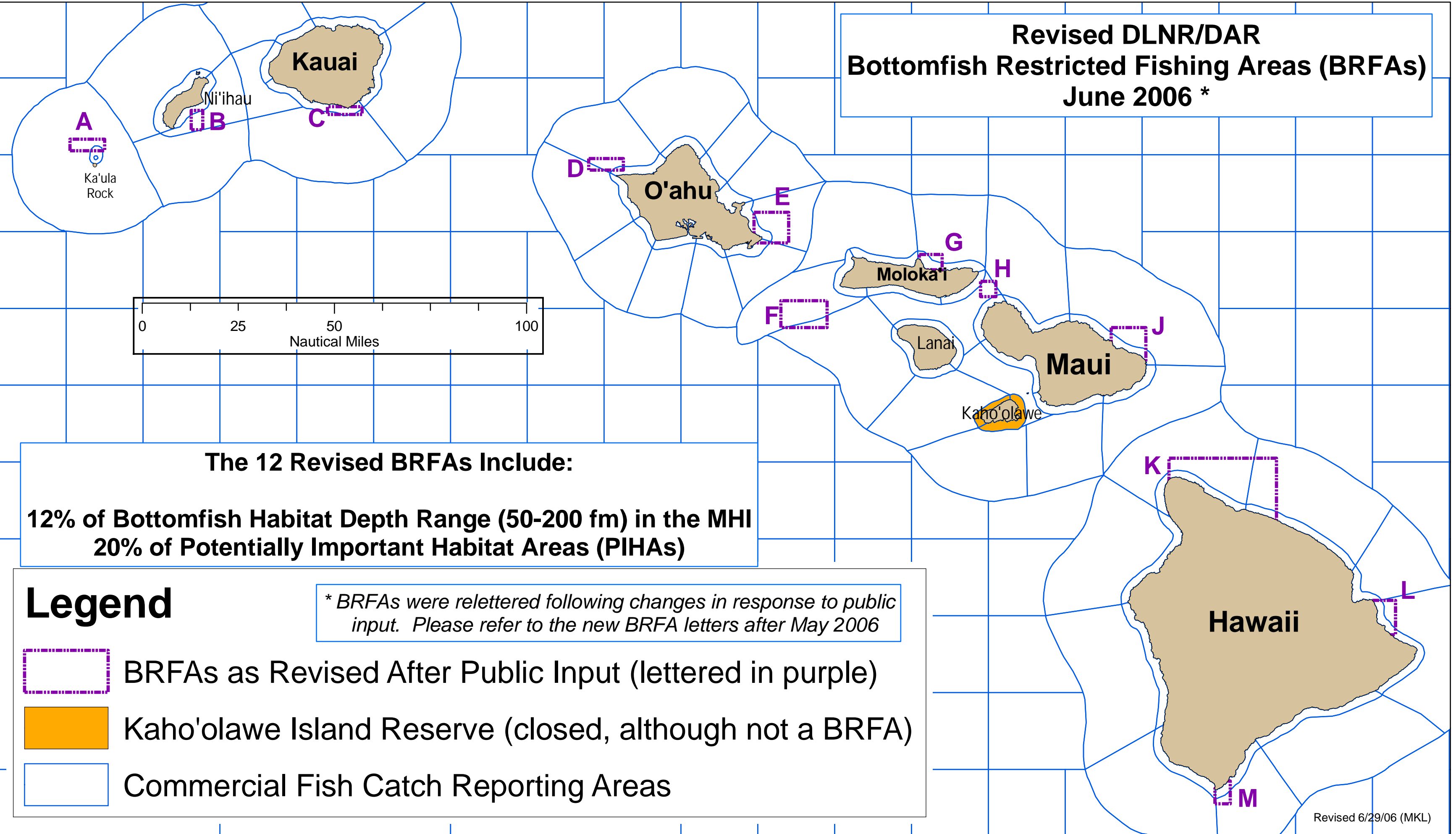
Another BRFA at East Maui (new letter “J”) area was adjusted to the north and west, in response to community concerns from fishers in Hana (again, to reduce local impacts, particularly in Hana).

Hawai‘i County:

The BRFA proposed at ‘Upolu Pt. Area (now letter “K”) was moved to the east to make sure Kawaihae fishers would still have access to fishable areas with decent weather and currents. The need for this action was raised both at Hilo and Kona meetings (Hilo fishers were equally concerned for folks at Kawaihae).

The BRFA near Hilo at Lele‘iwi Pt. (now letter “L”) was moved south for navigation and safety reasons (allowing small boats a safe place to fish near Hilo Harbor). Finally, the BRFA proposed at Ka Lae (South Point) (now letter “M”) was shifted to the east, leaving a place in the lee (Kona side) to fish and opening up a previously closed area (existing BRFA 19).




Revised DLNR/DAR Bottomfish Restricted Fishing Areas (BRFAs) June 2006 *



The 12 Revised BRFAs Include:

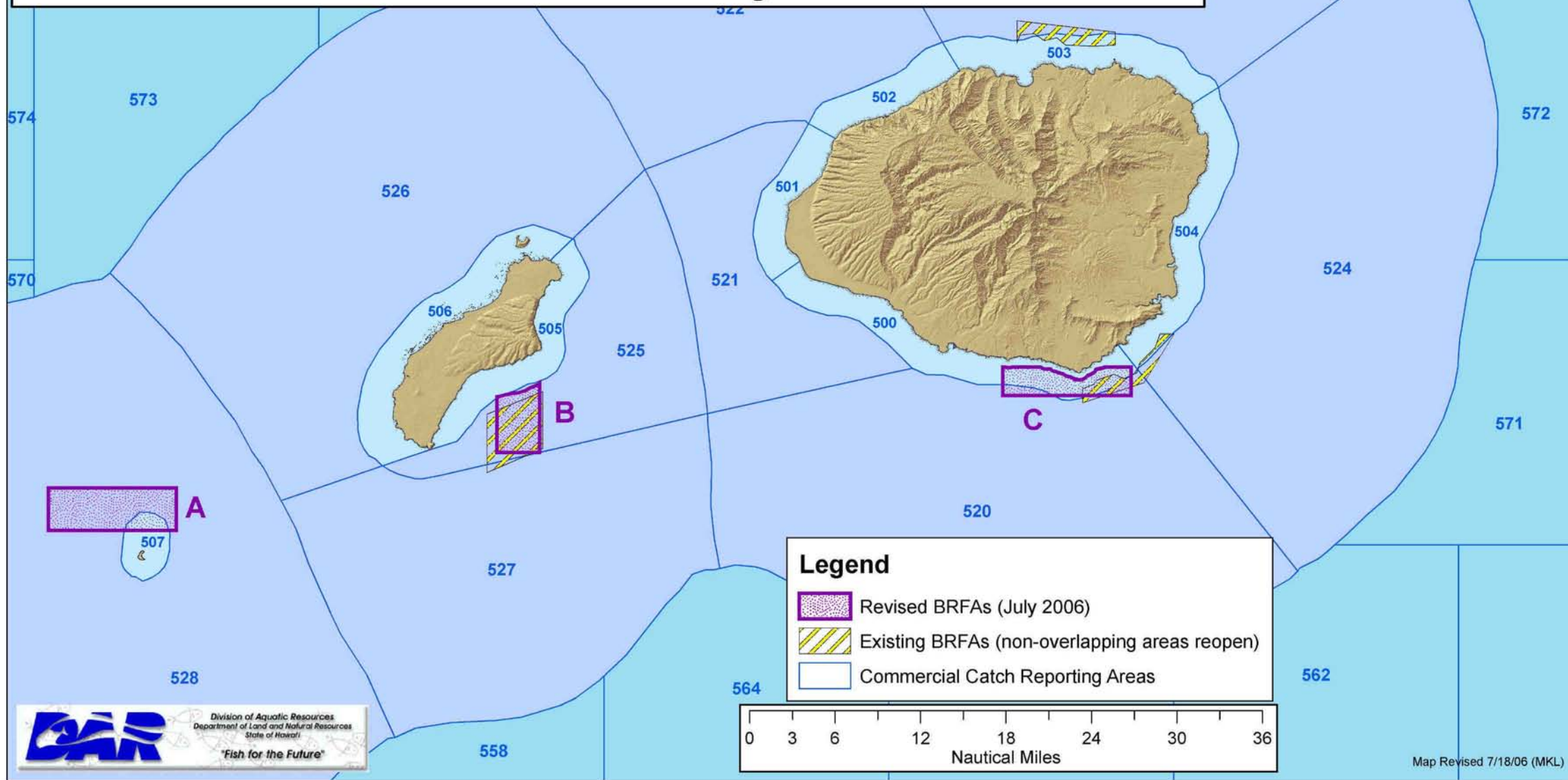
12% of Bottomfish Habitat Depth Range (50-200 fm) in the MHI
20% of Potentially Important Habitat Areas (PIHAs)

Legend

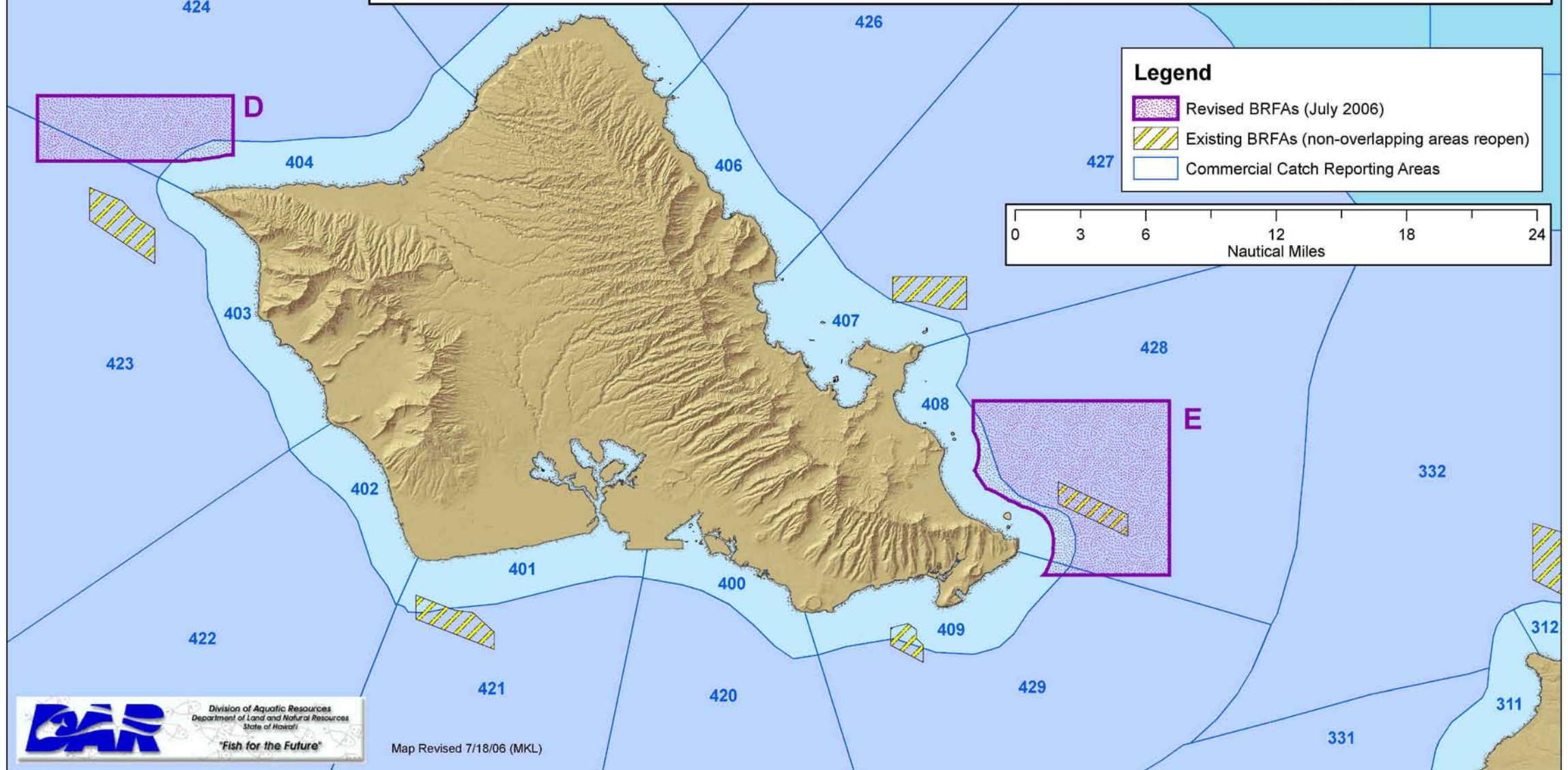
-  BRFAs as Revised After Public Input (lettered in purple)
-  Kaho'olawe Island Reserve (closed, although not a BRFA)
-  Commercial Fish Catch Reporting Areas

** BRFAs were relettered following changes in response to public input. Please refer to the new BRFA letters after May 2006*

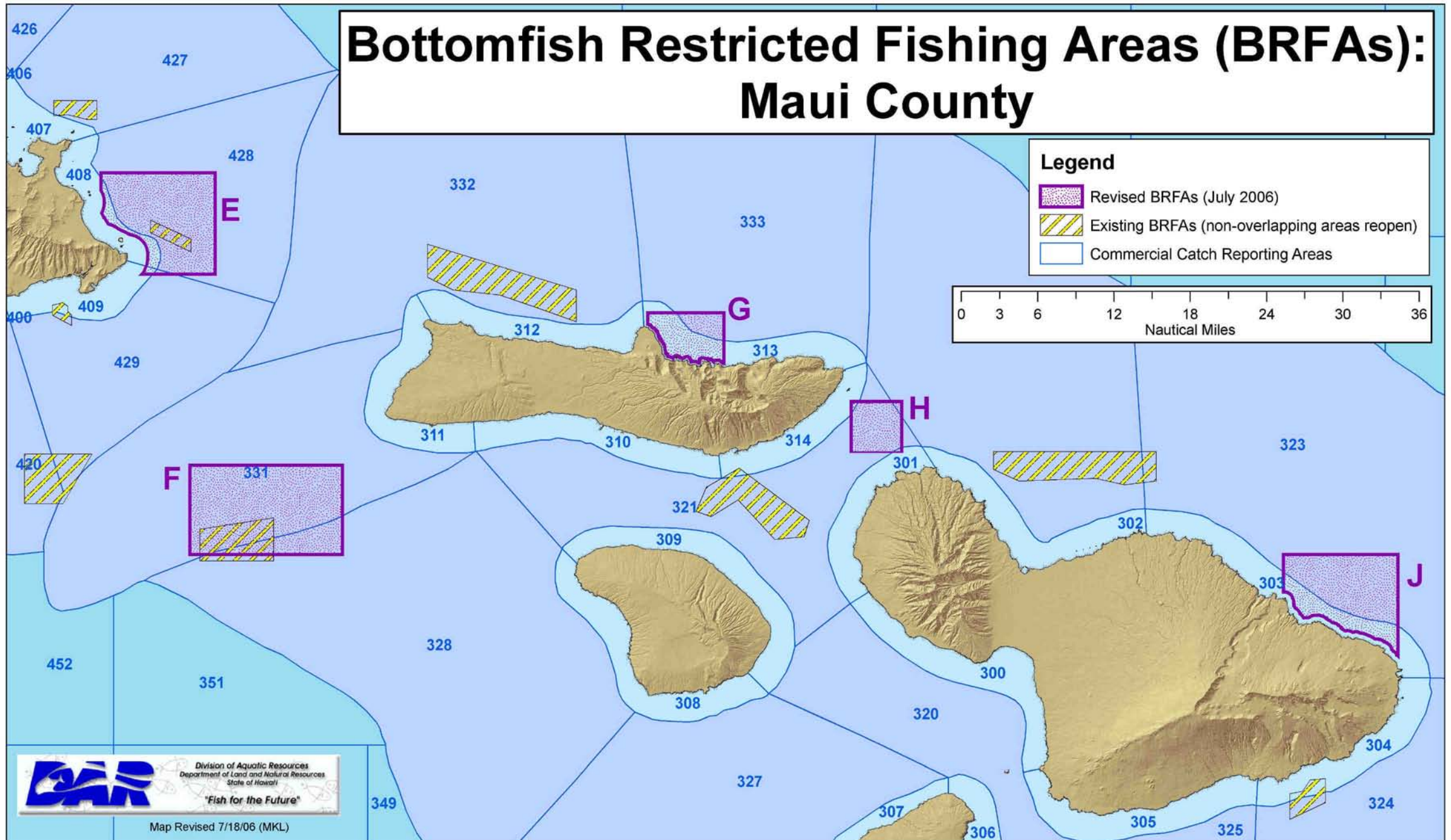
Bottomfish Restricted Fishing Areas (BRFAs): Kauai County



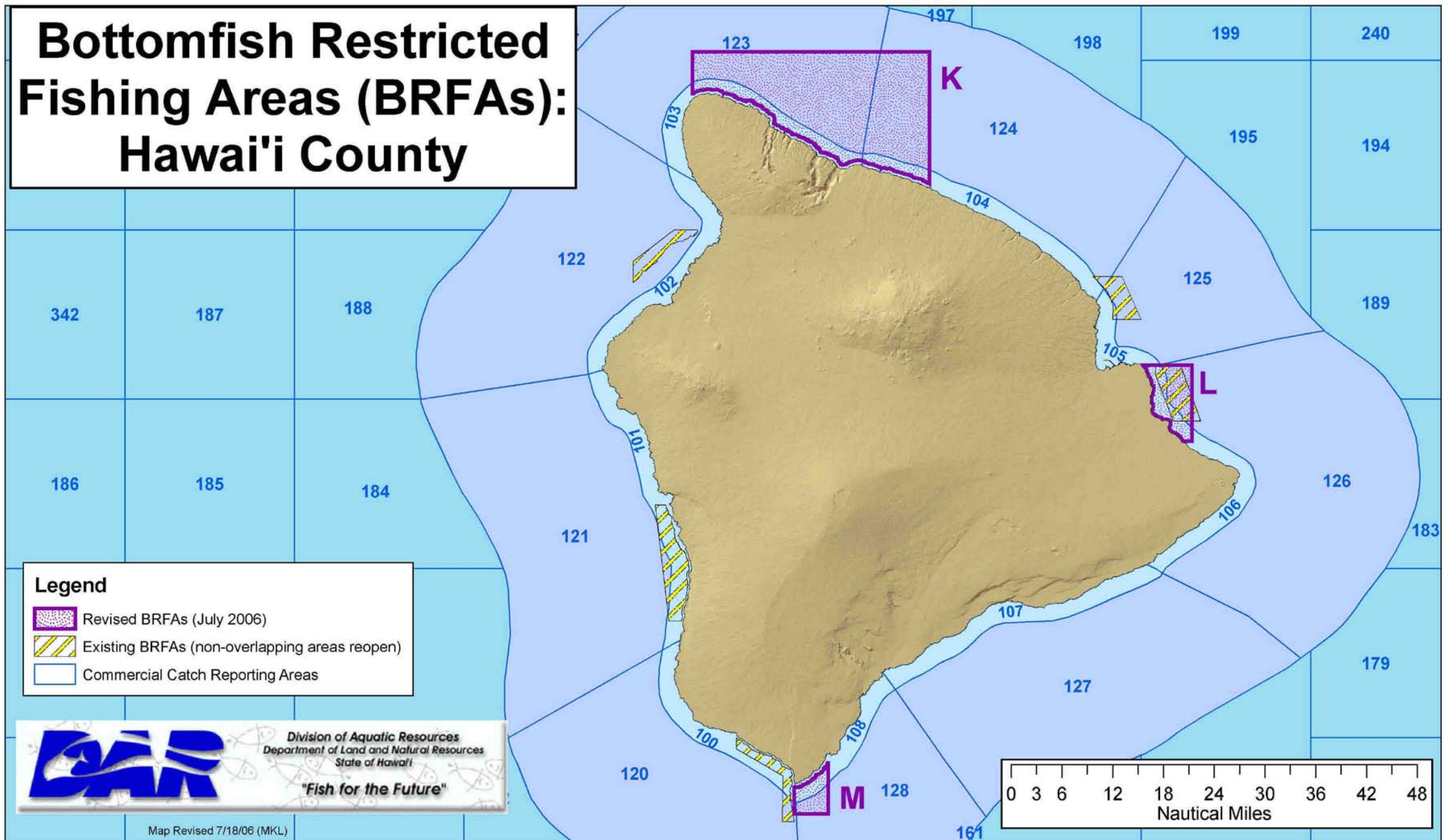
Bottomfish Restricted Fishing Areas (BRFAs): O'ahu (Honolulu City & County)



Bottomfish Restricted Fishing Areas (BRFAs): Maui County



Bottomfish Restricted Fishing Areas (BRFAs): Hawai'i County



Main Hawaiian Islands (2004)								Proposed WESPAC Closure							
	2004 Catch	% Total Catch	January	February	March	April	May	June	July	August	September	October	November	December	
WESPAC Proposed Seasonal Closure							0000000	0000000	0000000	0000000					
Opakapaka Spawning Season							XXXXXXXXXXXXXXXXXXXX								XXXXXXXXXXXXXXXXXXXX
Opakapaka Landings	105,072	27.67%	15,824	9,277	5,142	8,040	5,359	3,216	2,708	4,219	5,746	9,131	16,603	19,607	
Onaga Spawning Season							XXXXXXXXXXXXXXXXXXXX								XXXXXXXXXXXX
Onaga Landings	88,141	23.21%	10621	7926	4889	5332	3177	2578	4274	2492	6479	7750	13499	19124	
Uku Spawning Season							XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX			
Uku Landings	77,150	20.32%	5308	2700	1598	3159	13279	11551	9848	6816	8521	5189	5386	3795	
Ehu Spawning Season									XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX				
Ehu Landings	27,207	7.16%	2577	2098	1460	2353	1909	1050	5109	1101	1390	1489	2399	4272	
Hapu'upu'u Spawning Season			XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX							
Hapu'upu'u Landings	9,384	2.47%	935	665	422	638	726	505	1530	455	473	316	1241	1478	
Total Bottomfish Catch (2004)	379,724		43,511	26,959	17,954	24,842	27,842	22,818	29,203	23,351	31,317	30,378	45,338	56,211	
Percentage of Total Catch			11.46%	7.10%	4.73%	6.54%	7.33%	6.01%	7.69%	6.15%	8.25%	8.00%	11.94%	14.80%	

WESPAC proposes a summer closure that would be implemented from May 1 to August 31 of each year for the entire MHI bottomfish fishery (both commercial and recreational vessels). Per WESPAC: Based on past landings the timing of the closure would be designed to achieve at least a 15 percent reduction in fishing mortality; targeting, landing and or selling the seven deep-slope bottomfish species would be prohibited during the closed season. WESPAC further states: Although bottomfish spawn year round, evidence indicates that spawning is greatest in summer months, so a summer closure would provide additional benefits by reducing fishing mortality of spawning bottomfish.

Two bottomfish species of concern are the ehu and onaga. These species, at least by one study, have a peak spawning period of September to November. The complex spawning peaks July to September (Haight 1993). There is a difference between when some spawning occurs and when peak spawning occurs. While some spawning may occur all year long, most spawning may occur in specific months. If these species have a well-defined spawning period, a closed season during this time would have some biological benefit by protecting the spawners only during this critical spawning time. The spawners are not protected any other time.

Given that the proposed WESPAC closed season is not based on the spawning period but apparently on the market cycle, the biological benefit is expected to be minimal. The season's principal benefit would be to reduce fishing effort for this complex during the closure. The assumption is that if effort is reduced, catch (and fishing mortality) will also be reduced. For this assumption to be valid, the average catch rate needs to remain constant and effort cannot be displaced to the open season. It would be reasonable to expect that fishers that have not fished during the closed season will attempt to fish more during the open season to make up for the lost catch/income. If effort is displaced and total effort is not reduced or only reduced minimally, the desired reduction in catch will not be achieved. Any allowance to continue to take some bottomfish during the closed season would further erode this option's effectiveness. The weakness with this option is the relatively temporary benefit, the minimal biological benefit, and the heavy dependence on no effort displacement.